THE EFFECTS OF MOOD AS A RECALL CUE FOR ABSTRACT NOUNS

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ABSTRACT

The study was designed to look at the effects of induced happy and sad moods as a recall cue for abstract nouns. Bower's network theory of memory and emotion was used as a theoretical basis. The factors of list length and retention interval were varied with the hypothesis that longer list lengths and retention intervals would increase the effectiveness of mood as a recall cue by increasing the strain on memory.

Forty subjects were randomly allocated to each of eight groups which differed in list lengths, retention intervals and the type of induction undergone. Subjects were first presented with a list of abstract nouns to learn. After either of the retention intervals, one of the moods was induced in subjects by their reading of mood-inducing self-referent statements. Pre and post induction mood scale scores and performance on a writing speed task were taken as measures of the robustness of the mood change.

Two separate analyses of the recall data were conducted, the second taking into account a possible confounding effect in the lists presented to the subjects. The first analysis showed a significant effect for short list and short retention interval groups, the second showed no significant mood-congruent effects. Also, it was not possible to be certain that mood had been induced in the subjects because although significant results were obtained for the mood scale scores, the writing speed results were not significant.

Therefore, no definite conculsions could be drawn regarding the effectiveness of mood as a recall cue for abstract nouns. A further experiment, designed to clarify the ambiguous results, was suggested.

CHAPTER I

Introduction and Literature Review

The last few years have seen an upsurge of interest in the relationship between affect and cognition. One area within this interaction, the mood-memory relationship, has been the focus of a number of studies. Specifically, these studies have been concerned with how mood affects memory. In the studies, moods have been induced at learning, at both learning and recall, and at recall. Most studies have shown mood-related effects.

Bower (1981) proposed an 'associative network theory of memory and emotion' to account for the mood-memory relationship. The effects of mood at the different stages in memory can be explained in terms of this theory.

The purpose of this thesis is to further investigate the effects of mood at recall. Bower's theory predicts that 'verbal labels' associated with a felt mood will be primed when that mood is being experienced. This suggests that if a mood is induced before the retrieval of a set of previously learnt verbal labels (e.g. descriptions of emotional experiences, emotional phrases, emotional nouns), the mood-congruent verbal labels will be primed. This priming will in turn make the material more accessible and increase the probability of greater recall of mood-congruent verbal labels as opposed to mood-incongruent verbal labels.

The questions asked in this thesis are:

1. whether a significantly greater number of mood-congruent abstract nouns will be retrieved if mood is induced at recall of material learnt in a neutral mood; and

2. whether differential manipulation of the factors of list length and retention interval will have any facilitating effect on this retrieval.

Thus, the experiment discussed in this thesis is an attempt to (a) clarify the efficacy of Bower's theory in predicting mood-memory interactions for verbal labels, (b) to look at the confines of this effect - can verbal labels as far-removed emotionally as positive and negative abstract nouns still elicit an effect? and (c) to ask whether longer lists and/or retention intervals will facilitate this effect.

To study the effects of mood on memory, it is first necessary to consider some of the problems inherent in the area. After a short discussion of these problems, a brief summary of the studies on the three mood-memory areas most researched follows. Bower's 'associative network theory of memory and emotion' is then described, as well as the explanations provided by the theory for the three effects previously discussed. Finally, the experiment which forms the substance of the present thesis is outlined, with a description of the similarities and differences between it and previous studies in the area.

Problems with Studies in the Mood-Memory Area

1. There is no firm, fixed definition of affect terms, the majority of studies on mood and memory do not define

the terms they use. In this thesis, the terms 'emotion', 'mood' and 'feeling state' have been used synonymously to refer to an affective state that is not acute and interruptive. Mood "can originate in internal stimulation and arousal (by drugs) ..., but also in evocations of long-term memories that cause autonomic or endocrine arousal. The effects of moods, ... are to establish contexts that influence and direct cognitive activies". Thus mood "provides context for ongoing thought processes without noticeably interrupting them" (from Simon, 1982, p.335,336). Mood therefore is a mild, non-interruptive arousal state that has been found to subtly influence thought and behaviour.

2. There are no criteria as to what constitutes the 'emotionality' of the 'emotional material' used as stimuli in mood-memory studies. The hedonic tone of the material is usually decided by the individual experimenters and their associates, and a range of 'intensity' of hedonic tone is seen in studies.

3. Studies in this area do not take into account the fact that emotional material generally tends to be more salient than non-emotional material and thus is remembered significantly better (cf Manning and Julian 1975; Strongman 1982, Strongman and Russell 1983; Erdelyi and Appelbaum 1974). This saliency of emotional material may have an influence on the congruency effects discussed in the following section.

4. Studies in this area require some means of mood induction. Mood has been induced in various ways - from hypnosis and self-referent statements to game situations and story-telling. Because the types of induction are so

different, it is quite possible that the moods they induce will also be different. And, once induced, very few measures exist for accurately gauging the robustness of the induced mood.

Studies on the Effects of Mood on Memory

Studies on the effects of mood on memory have been concerned with three main areas: (1) mood induced at learning; (2) mood induced both at learning and at recall; and (3) mood induced at recall.

1. Mood induced at learning. This effect has been called the "mood-congruency" effect (Bower, Gilligan and Monteiro 1981). In two studies carried out by Bower et al. (1981), either a happy or sad mood was induced in subjects by hypnotism. Subjects were then asked to read either a story about happy Andre, for whom everything was going well, and sad Jack, for whom everything was not going well (experiment 1), or a narrative about Mike and Joe, describing equal numbers of happy, sad and neutral incidents in their lives (experiment 5).

Results of the studies showed a recall advantage for mood-congruent incidents. Thus, subjects in a happy mood at learning tended to recall a significantly greater number of happy incidents than sad incidents, while those in a sad mood at learning recalled a significantly greater number of sad than happy incidents.

This effect showed that mood can affect the encoding of material. It suggested that mood acts like a 'filter',

selecting mood-congruent material, which leads to selective storage of this material, so that at recall it is more salient than material which is not mood congruent.

2. Mood induced at learning and recall. The 'mood-state-dependent' (Bower 1981) or 'affect-dependent' (Bartlett and Santrock 1979) effect has received a large amount of attention. Basically, studies have shown that people can "best retrieve a memory by reinstating the emotion they were experiencing when they originally stored it". (Bower and Cohen 1982, p.294). Thus, mood has been shown to act as a context retrieval cue.

This effect seems to be quite widespread as it has been demonstrated in subjects with moods induced by hypnotism (Bower, Monteiro and Gilligan 1978, Bower et al., 1981), and by the imagining and retelling of past happy and sad experiences (Bartlett, Burleson and Santrock 1982) as well as in clinical patients with mood swings (Henry, Weingartner and Murphy 1973; Weingartner, Miller and Murphy 1977; Clark and Teasdale 1982). Macht, Spear and Levis (1977, experiment 1) also showed the effect using slight electric shocks as a means of inducing anxiety in their subjects.

Different subject types have shown the effect - from children below the age of five (Bartlett et al. 1982, Bartlett and Santrock 1979), to clinical patients (Henry et al., 1973, Weingartner et al., 1977, Clark and Teasdale 1982), to university students (Bower et al. 1978, 1981).

Although a variety of stimulus materials and retention intervals have been used, the effect has proved quite

resilient. Stimuli have ranged from abstract nouns (Bower et al., 1978), to concrete nouns (Bartlett and Santrock 1979, Bartlett et al., 1982; Macht et al., 1977), to self generated events in the form of verbal associations (Weingartner et al., 1977). While retention intervals varied from three minutes (Bartlett et al., 1982), to 20 minutes (Bower et al., 1978), to four days (Weignartner et al., 1977).

Not all the results have been so clearly positive though. Bower et al., (1978), using abstract nouns as stimulus material, were able to show a state-dependent effect only when two similar lists had been learnt in two different moods by the subjects. Thus for abstract nouns, mood served as a distinctive learning-recall context only when the subject had to keep separate two interfering sets of material (experiment 3). The two studies (experiments 1 and 2) using the learn-list-in-mood-1-or-2 - recall-list-in-mood-1-or-2 procedure showed no state-dependent effects.

Macht et al., produced a state-dependent effect using a list of concrete nouns of medium frequency taken from the Thorndike-Lorge norms (1977, experiment 1). They were, however, unable to replicate this effect (1977, experiment 2).

Isen, Clark, Shalker and Karp (1978), using personality trait words as stimulus material and success or failure at a computer game as a means of inducing mood, were not able to produce a state-dependent effect. Instead, their results showed an effect of mood as a retrieval cue for positive trait words recalled in a happy mood.

Ideally, in order to demonstrate that mood acts as a

context cue, stimulus material should not be emotional. Usage of emotional stimuli would result in confounding effects with mood at learning leading to selective recall of mood congruent material. Although a number of studies in this area have used non-emotional stimuli to show the effect, it is important to realize that confounding effects could occur with the use of emotional stimuli.

On the whole however, the mood-state-dependent effect has been shown to be widespread and strong, being seen in studies using differing subject types, stimuli, methods of mood induction and retention intervals.

3. Mood induced at recall. Effects in this area have not been very consistent. Results for the effects of induced mood on the retrieval of memories of actual life experiences have been quite consistent, but those for the retrieval of experimentally learnt verbal material have not been.

Lloyd and Lishman (1975) found that the reaction time to recall pleasant memories increased for clinically depressed patients - the more severe the depression, the longer the reaction time. Teasdale and Fogarty (1979) found that retrieval latencies for pleasant experiences were significantly longer in a sad than in a happy mood.

In two other studies, (Teasdale, Taylor and Fogarty 1980, Teasdale and Taylor 1981), subjects were found to recall more happy memories in a happy mood than in a sad mood and vice versa. Bower (1981) found that subjects recording emotional incidents in their diaries recalled a greater number of pleasant incidents in a happy mood and a

greater number of unpleasant ones in a sad mood. He also found the same effect with hypnotically induced moods in the recall of childhood incidents. Natale and Hanatas (1982) found that a sad mood caused a decrease in recall of positive life experiences and that a happy mood caused a decrease in recall of negative events and an increased recall of positive events.

Snyder and White's (1982) subjects showed significantly greater recall for mood-congruent events from the previous week for both moods. The estimated frequencies for events were also found to be mood-congruent, so that more positive events were estimated to have occurred by happy subjects and more negative events by sad subjects. Finally, Madigan and Bollenbach (1982, experiment 1) found that subjects rated more memories recalled in association to 15 stimulus words as mood congruent, so that subjects in a happy mood rated a greater number of associated memories as happy and sad subjects a greater number as sad.

Thus, reaction time for memories increased when mood at recall was not congruent with the memories and greater numbers of mood-congruent memories of experiences and events were recalled by subjects, so that mood-congruent effects were obtained with memories of emotional experiences and events.

Unfortunately, the effects of induced moods on the recall of positive and negative verbal material have not been as clear. Bower et al., (1981), were unable to show mood congruent effects using either the story about happy Andre and sad Jack (experiment 2) or a narrative about Paul,

describing happy, sad and neutral incidents in his life (experiment 4).

Interestingly, a few studies designed to show state-dependent effects showed recall-mood-congruent effects instead. Bower et al., (1978), using abstract nouns as stimulus material, found no overall difference in the recall of previously learned positive versus negative abstract nouns in subjects recalling in happy versus sad moods. The only evidence of a differential effect of mood at recall was that, in two of the experiments (experiments 1 and 2), the hedonic tone of the first word recalled matched the recall mood.

Isen et al., (1978), using personality trait words as stimulus material, found significantly more positive trait words being recalled for subjects who had undergone a happy mood induction at recall (success at a computer game), irrespective of whether they had originally learnt the list after a happy or sad induction (failure at the game). Thus, although no state-dependent effects were produced, there was a mood-congruent recall effect for positive personality trait words after a happy induction. One possible reason for this was that the sad induction may not have worked, and so no mood-congruent effects for the sad subjects were seen.

Teasdale and Russell (1983) followed on from this experiment, using sets of mood cards to induce mood. Inducing mood only at recall, they showed a differential effect of mood at recall for both positive and negative personality trait words. Madigan and Bollenbach (1982, experiment 2) asked subjects in happy and sad moods to give one-word

responses to 15 stimulus words. These word-pairs were later rated by two independent judges for their pleasantness/unpleasantness. It was found that the mean ratings for the associated words produced by the happy subjects were significantly more pleasant than those produced by the sad subjects. Unfortunately, there was a confounding effect as the experimenters had asked the same subjects to associate a past memory to each of 15 different stimulus words and to then rate these memories for their pleasantness/unpleasantness just prior to this task. Therefore it is quite possible that mood-related areas were already primed for the subjects and that is why they showed a mood-congruent effect for the recalled associated words.

Thus, in studies of the effect of induced mood on the recall of verbal material, only those of Isen et al., (1978), Teasdale and Russell (1983) and Madigan and Bollenbach (1982), less reliably, have shown mood-congruent effects. The first two studies used personality trait words as their stimulus material, the third, simple nouns and verbs. The Bower et al., (1978), results, where the hedonic tone of the first recalled word matched the recall mood, also seem to suggest a mood-congruent recall effect, but it is very small.

If a mood-congruent effect was produced with personality trait words as stimuli (Isen et al., 1978; Teasdale and Russell 1983), and with associations to stimulus words (Madigan and Bollenbach 1982), why was it not produced with the narratives used in the Bower et al., studies (1981)? One possible reason, proposed by Teasdale and Russell (and by Bower, 1983), is that personality trait words are more related to actual life experience than are descriptions of

emotional incidents experienced by other people. Personality trait words, they say, are much more likely to have been associated with distinct mood states in the personal lives of the subjects.

By providing this explanation for their results, Teasdale and Russell are talking in terms of the state-dependent effect. They are suggesting that personality trait words related to a specific mood would have been used when the subject was experiencing that mood. Therefore, they argue, induction of mood in their experiment acted as a context retrieval cue.

To summarize, most studies on the effects of mood on memory have been in three main areas. The 'mood-congruency' effect is seen with mood induced at learning - where mood leads to selective storage of mood-congruent material. Mood induced both at learning and recall leads to the 'mood-state-dependent' effect whereby mood is seen to act as a context retrieval cue. Mood induced at recall has produced recall of mood-congruent memories of life experiences but results for the recall of verbal material have been less consistent. The effect has only been shown with personality trait words as stimulus material. The effect was shown with the stimulus materials of simple nouns and verbs, but it may have been a result of confounding effects. It is one of the aims of this thesis to determine whether the effect can be produced with abstract nouns as stimulus material.

The Associative Network Theory of Memory and Emotion

To better understand the relationship between mood and memory, a number of psychologists have proposed very similar concepts. Isen (1975) stated that "affect plays a role in the organization and utilization of memory". G.H. Bower, recognizing the importance of affect in the organization and utilization of memory, elaborated on this concept to arrive at the 'associative network theory of memory and emotion' (Bower 1981) in which he tried to account for the consequences of emotion, once aroused, on memory. Findings in the mood-memory domain since then have, by and large, been explained in terms of this theory. Bower went on to elaborate on this preliminary theory to arrive at one able to account for how an emotion is caused in the first place (Bower and Cohen 1982).

The associative network theory is very similar to the common concept of a semantic-network of long-term memory - the major difference is that to this basic associative network, Bower has added the concept of the 'emotion node'.

To put it very simply, the associative memory network can be conceived of as a large number of interconnected elements or NODES, representing thoughts or events in the form of propositions or concepts. These nodes are connected to each other by associative links. When a concept or proposition is attended to, its node is stimulated and the process of SPREADING ACTIVATION occurs. This is a process whereby, once a node is stimulated, activation spreads out along portions of the network associated with that node, thus making more available, or PRIMING, these related areas.

To this associative memory network, Bower introduced the EMOTION NODE. He proposed that "each distinct emotion ... has a specific node in memory that collects together many other aspects of the emotion that are connected to it by associative pointers". These include the particular emotion's "associated autonomic reactions, standard role and expressive behaviours and descriptions of standard evocative situations". Also associated are "the verbal labels commonly assigned to this emotion" and "propositions describing events from one's life during which that emotion was aroused" (Bower 1981 p.135).

Bower reformulated this basic theory in order to deal not only with the consequences of an emotion once aroused, but also with the causes of the emotion - how it was aroused initially. He introduced the 'blackboard' control structure "to model how the person combines several knowledge sources in arriving at an emotional interpretation of a situation" (Bower and Cohen 1982, p.292). These emotional-interpretation rules form the basis of the new theory and are open to change as knowledge sources available for one situation will be different from those available for another situation.

The new theory postulates not one emotional node per emotion, but three. They are the emotional feeling node, the emotion concept node and the emotion 'name' node. These three nodes are responsible for different aspects of the emotion in question. The emotional feeling node is responsible for "the subjective emotional experience, the autonomic behaviours and the cognitive influences". The emotion concept node "collects together meaningful

connections of the concept (and points to the first node as its referent)". And finally, the emotion 'name' node "is used to talk about the concept and its referent emotion". This node is not directly connected to the emotional feeling node. (See Figure 1, from Bower and Cohen 1982, p.327).

Bower introduces this division in order to differentiate between 'hot' and 'cold' cognitions. This differentiation makes it possible to account for the fact that we are able to discuss an emotion and its associated feeling, without actually experiencing any emotional feeling. The lack of a direct connection between the emotional feeling node and the 'name' node serves as an explanation for this effect.

Important for the purposes of this thesis is the interaction between the emotional feeling node and the verbal labels associated with the emotion. Unfortunately, just how this interaction occurs is not made clear in the latest theory. It is assumed that activation of the emotional feeling node leads to activation of the verbal labels associated with the emotion - although the reciprocal effect does not occur.

So much for all the emotional aspects to each node, but why is this close association so important? These emotion nodes "can be activated by many stimuli" and, once activated, this activation "spreads activation throughout the memory structures to which it is connected" (Bower 1981, p.135). Thus the close association between the emotion nodes and their related aspects is that activation of any of these areas, except for the 'name' node, will lead to priming and perhaps even activation of the emotion feeling

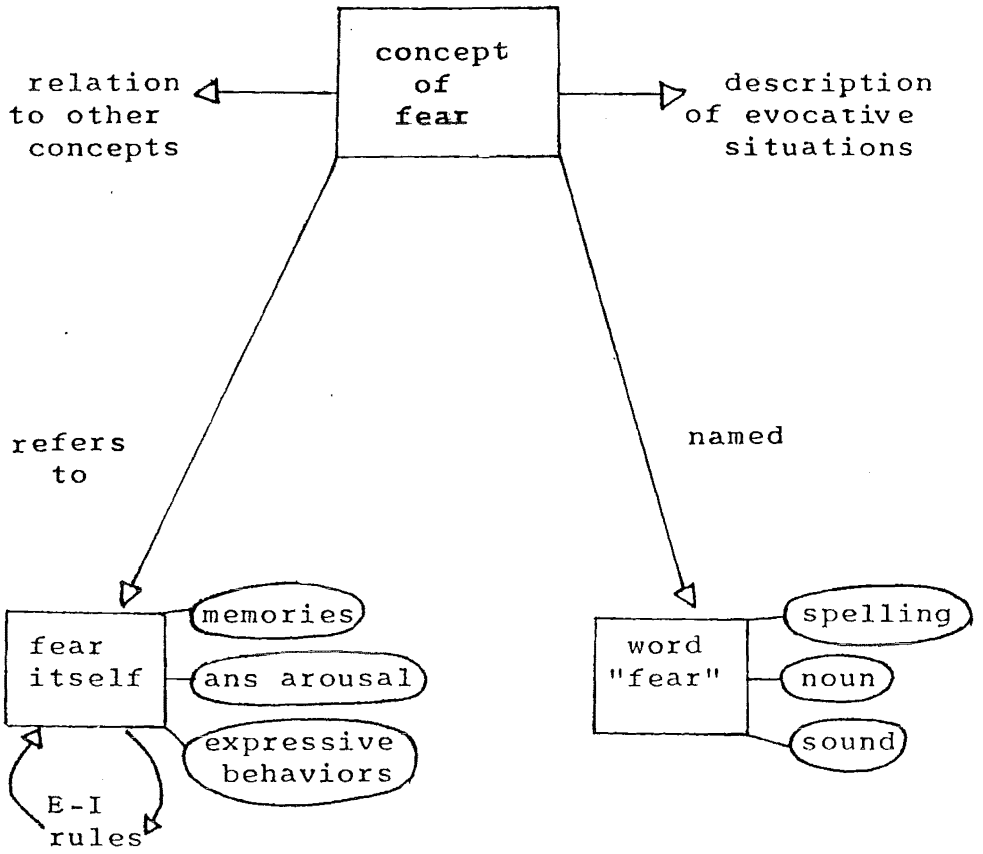


FIGURE 1. Relations among network nodes representing an emotion, the concept of it, and words naming the concept.

(from Bower and Cohen, 1982, p.327)

and concept nodes, priming all their related areas.

Bower also postulated that activation of one emotion node may result in inhibition of the 'opposite' emotion node - "each emotion may reciprocally inhibit an emotion of opposing quality, as fear inhibits joy" (Bower 1981, p.135). Thus in terms of the theory, activation of an emotion node and its related aspects can occur simultaneously with inhibition of the 'opposing' emotion node and its related aspects.

To summarize, within the associative memory network are emotion nodes - three for each emotion. These nodes are linked via associative pathways, to physiological effects such as autonomic reactions and expressive behaviours, as well as to the more experiential, 'cognitive' effects such as events associated with the emotion and verbal labels used to describe the emotion. Activation of an emotion node in turn spreads activation throughout these associated areas, causing them to be primed. Primed nodes are much easier to activate. Therefore, if any of the related areas is further primed (e.g., say the person was taken back to the room where he or she learnt some list), this 'double priming' will tend to lead to the material being remembered. Activation of one node may also result in inhibition of the opposing emotion node, leading to decreased recall of material associated to that node.

Explanations for the Mood-Memory Effects in Terms of the Theory

The three effects seen in studies of the influence of mood on memory can be explained by the associative network

theory of emotion. According to Bower (1981) and Bower and Cohen (1982), greater memory for mood-congruent events or situations in a mood induced at learning, may be due to either or all of the following: (a) there is greater semantic elaboration of mood-congruous material (b) mood congruous material is more likely to remind subjects of past events in their own lives and thus heightens the mood and (c) mood congruous material causes a more intense emotional reaction than does incongruous material. All of these effects could be due to an increase in activation and thus a strengthening of associations, thus leading to greater semantic elaboration, an increased likelihood of recall of similar past events and an increase in mood intensity.

The state-dependent effect is by far the most salient and most-studied effect. The effect can be explained in terms of the theory, thus: - during learning, the stimulus materials become associated to the node describing the context and to the emotion node then active. Later, when asked to recall material learnt in the original context, the subject activates this context node in memory and the activation spreads out from it. By introducing, at recall, the same emotion or emotions, the subject was experiencing during learning, the activation from these emotion nodes spreads out and summates with that of the context node. This summation of activation at the intersection nodes, the learnt material, causes it to become more accessible, and thus more likely to be retrieved from memory.

Although the effects of mood at recall are most often explained in terms of the state-dependent effect, where

experiences, events, etc. are encoded in the context of a particular emotion, the theory also predicts a mood-congruent recall effect. This is the effect in the third group of studies previously discussed. To quote Bower, once a mood is aroused, "concepts, words, themata and inference rules connected to the aroused emotion should be primed and more available" (Bower and Cohen 1982, p.302). Unfortunately, the only words so far found to be sensitive to this effect are the personality trait words used in the studies by Isen et al., (1978) and Teasdale and Russell (1983) and the one-word associations to stimulus words in Madigan and Bollenbach's study (1982, experiment 2).

The experiment reported on this thesis was designed in an attempt to show similar effects to those of Teasdale and Russell, using positive and negative abstract nouns. In this experiment, the variables of list length and retention interval were differentially manipulated with the hypothesis that increased list lengths and retention intervals would increase the strain on memory and thus perhaps enhance the effectiveness of mood as a recall cue.

The experiment was a combination of the methods and materials used by Bower et al., and Teasdale and Russell. The list of abstract nouns was taken from the concreteness norms of Paivio, Yuille and Madigan (1968) - The same norms used in Bower et al.'s study (1978). The method of induction, using mood statement cards, was taken from Teasdale and Russell (1983).

However, unlike the Teasdale and Russell study, where only one list and one retention interval were used, the experiment described in this thesis used varied list lengths and retention intervals. It was hoped that differential manipulation of these factors would lead to a better understanding of the processes involved in the mood-at-recall - memory interaction.

CHAPTER II

The Experiment

The experiment performed was a combination of the methods and materials used by Bower et al., (1978) and by Teasdale and Russell (1983), with a few additional changes - two separate list lengths and two separate retention intervals.

Before commencing on the experiment proper though, a number of pilot studies were carried out to determine the best method of presenting the mood cards so as to produce the greatest mood changes. Administration of the cards to groups of individuals was found to be hopelessly ineffective. Individual administration of the cards in a close, sound-attenuated room, where subjects were asked to read the mood cards to themselves at their own rate was found to be better, but the mood change was still not found to be significant. The procedure found to obtain the best results was suggested by a number of articles (Alloy, Abramson and Viscussi, 1981; Natale, 1977). In this procedure, instructions were presented to the subjects via cassette, and 20 second intervals were given to them to read each statement to themselves and then aloud.

Method

Overview

Subjects were presented visually with either an 18 or 36 word list of equal numbers of positive, neutral and negative abstract nouns. The lists were presented thrice

in succession to ensure maximal opportunity for learning. After an interval of either one hour or one week, a happy or sad mood state was induced in the subjects, after which they attempted to recall the previously learned list. Subjects were given a writing speed task immediately before and after the mood induction. Performance on this task served as a more objective measure of mood change than the filling out of a mood scale.

Subjects

Forty student volunteers were recruited from Stage I courses. There were 7 males and 33 females. Thirty five of the subjects were in the 18-25 age range, the remaining five subjects were all above this age range. The subjects were not paid for taking part in the experiment, which lasted half an hour.

Experimental Design

A design with the between subject variables of type of mood induced, list length and retention interval, and the within subject variables of mood ratings, writing speed and word recall was used. Each subject received either a happy or sad mood induction, was presented with either a short (18) or long (36) word list and had a retention interval of either one hour or one week (see Table 1).

Subjects were randomly allocated to each of the eight groups so that there were 5 subjects per group.

TABLE 1. Showing the division of subjects into eight groups, with different list lengths, retention intervals and type of induction.

		Group	List length	Retention Interval
Mood at Recall	Happy	A	18 words	one hour
		A'	18 words	one week
		B	36 words	one hour
		B'	36 words	one week
	Sad	C	18 words	one hour
		C'	18 words	one week
		D	36 words	one hour
		D'	36 words	one week

n = 5 subjects per group

Materials

Mood Measures. Subjects rated their mood on slips of paper which were labelled in the following manner:

	0 NOT AT ALL	-	100 EXTREMELY
ANXIOUS			
DESPONDENT			
HAPPY			

(from Teasdale and Russell 1983)

Subjects were asked to rate each mood separately on a scale of 0 to 100, where 0 was not at all anxious, despondent or happy, and 100 was extremely anxious, despondent or happy.

Mood Induction. Two sets of 12 statements each, typed out on plain white cards, one statement per card, were used. The sets of mood statements, one happy, one sad, were the same statements used by Teasdale et al. (1981, 1983).

The statements for the sad induction were:

I feel unhappy
I feel sad and blue
I feel fed up
I feel pretty low
I just feel drained of energy, worn out
Things seem futile, pointless
I feel hopeless
I feel downhearted and miserable
I feel so tired and gloomy that I would rather just sit than do anything
I feel heavy and sluggish
It seems such an effort to do much
I'm fed up with it all

The statements for the happy induction were:

I feel pretty good right now
I feel happy
I feel cheerful, confident
I can think quickly and clearly right now
Right now, I feel very contented
Right now, I feel like smiling
I feel alert, happy and full of energy
I have a feeling of lightness and joy
I really like this light-hearted feeling
I can feel a smile on my face
I feel so good I almost feel like laughing
It feels great to be alive!

Subjects were told that while reading through the cards, they should try hard to get into the state suggested by the statements and try and feel the mood described. Before reading their mood cards, subjects were asked to read the following instructions:

"This exercise is not intended to be harmful or frightening. It is only an effort to find out if you can talk yourself into a mood. The 12 cards that you are going to read contain mood statements. Each statement will suggest a specific feeling and will help you to induce that feeling in yourself.

Your success in talking yourself into the mood will depend to a great extent on your cooperation and willingness to participate fully in the induction procedure.

Try to feel the mood suggested by the statements. Saying each statement out loud will help you to induce the feeling in yourself. Concentrate hard on each statement and you will be able to feel the mood."

Writing Speed Task. Immediately before and after the mood induction, subjects were asked to write down, as fast as possible, the numbers descending from 100. They were given 1 minute to do this. The speed with which subjects perform - the total number written in a minute - has been found to be an accurate measure of changes in mood (Velten 1968; Natale 1977).

Word Lists. All the words in the lists were taken from the concreteness norms of Paivio, Yuille and Madigan (1968). As in Bower et al.'s study (1978), only words with concreteness ratings of between 2 and 2.25 were taken. There were 36 words in all - 12 positive, 12 neutral and 12 negative. This 1:1:1 ratio was kept in the 18 word lists. Words with positive, negative and neutral connotations to the experimenter were chosen. The words were placed in random order and presented visually to the subjects. (See Appendix 1 for the words).

The group with the short retention interval and the happy induction and the group with the long retention interval and the sad induction were presented with the same 18 word list. The group with the short retention interval and the sad induction and the group with the long retention interval and the happy induction were presented with the same 18 word list. All four groups learning the 36 word list were presented with the same words, but in different orders.

Slide projector and Cassette Player. A slide projector with an attached timer was used to present the list of words to the subjects. The words were typed in in white lower-

case letters against a black background to facilitate easy reading. Each word was presented for 2 seconds.

A cassette with instructions on what to do during the second (the mood-induction-recall) part of the experiment was played to the subjects. Instructions on how to fill in the mood scale, on how to do the writing speed task and the mood induction, were included. This ensured as uniform an experimental environment as possible for all subjects. (See Appendix 2 for taped instructions.)

Procedure

At the beginning of part one, the experimenter explained that the subjects would first be shown a list to learn and that when they came back for part two, a mood would be induced in them, when they'd be asked to recall the list.

When subjects came for part one of the experiment, they were asked to fill in the mood scale, to determine their mood at the time of learning. They were then presented visually, one slide every 2 seconds, with the list of words. This list was presented thrice in succession to facilitate learning. Subjects were then asked to write down all the words they could remember. At the end of part one, subjects were asked not to rehearse the material they had learnt.

During part two of the experiment, either one hour or one week after part one, subjects were seated in a shuttered, sound-attenuated room. They sat at a table facing away from the experimenter, who sat behind, out of sight. All the

materials needed for the study were placed on the table in front of them.

Once subjects were seated at the table, the cassette was played and they were asked to follow the instructions on it. Subjects first had to fill out a mood scale after which they did the writing speed task. After this, they read the mood cards, first to themselves and then aloud. When the mood induction procedure was completed, subjects performed the writing speed task and then filled out another mood scale. Finally, subjects were asked to recall all the words they could remember from the list they had learnt in part one. They were given 2 minutes to do this. At the end of the experiment, subjects were thanked and allowed to go.

CHAPTER III

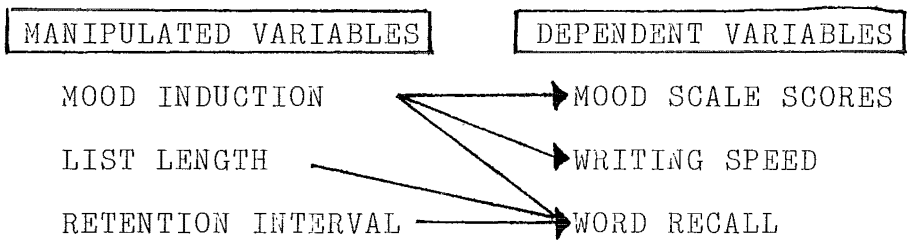
Results

The experiment design involved a number of variables. The manipulated variables were those of MOOD INDUCTION (happy or sad), LIST LENGTH (18 or 36 words) and RETENTION INTERVAL (one hour or one week).

Variables dependent on the type of mood induction were the ratings of the MOOD SCALE measures of anxiety, despondency and happiness, and of subjects' performance on the WRITING SPEED task. Measures were taken before and after the induction procedure and compared.

Dependent on the type of mood induction, the list length and the retention interval, was the variable of WORD RECALL - the number of positive, neutral and negative abstract nouns recalled by the subject after the induction.

Thus, the variables were as follows: -



Separate Anovas were performed for mood scale scores, writing speed and word recall. For MOOD SCALE scores and WRITING SPEED, a comparison of before and after scores was made. For WORD RECALL, recall of the three word-types was compared for pairs of groups differing only in the type of mood undergone. Lane's (1981) general analysis of variance

program, modified for the Apple II+, was used for analyzing the data.

The following effects were expected:

For the 'Happy' groups:

An increase in post-induction ratings of happiness and a decrease in those of despondency and anxiety; a post-induction increase in performance on the writing speed task; and a greater number of positve than negative and neutral words recalled.

For the 'Sad' groups:

An increase in post-induction ratings of despondency and anxiety and a decrease in that of happiness; a post-induction decrease in performance on the writing speed task; and a greater number of negative than positive and neutral words recalled.

Effects of Inductions on Mood Scale Scores

An initial Anova was performed on the pre and post induction mood scale scores of the Happy and Sad groups. This Anova involved the factors of type of induction (happy or sad) as well as pre and post-induction mood scale scores.

As the induction time (before-after) × scale interaction was found to be very large $F(2,76) = 40.23$ $p<.01$, further analyses were performed. Changes in the ratings of anxiety, despondency and happiness before and after induction were analyzed separately for the happy and sad groups.

1. For the happy induction. An Anova was performed for all the groups who underwent the Happy induction. The Anova involved the factors of retention interval, list length and pre and post induction mood scale ratings of anxiety, despondency and happiness. The mood scale × time interaction was found to be significant $F(2,32) = 14.32$ $p<.01$. A massive pre/post induction effect was also found $F(1,16) = 2236.36$, $p<.001$.

Figure 2 shows the mean pre and post induction ratings of anxiety, despondency and happiness for the four groups who underwent the happy induction.

Quite clearly, after the induction, subjects' ratings of anxiety and despondency decreased, while that of happiness increased.

2. For the sad induction. A separate Anova was performed for all the groups who underwent the Sad induction. As for the previous Anova, this one involved the factors of retention interval, list length and pre and post induction mood scale ratings of anxiety, despondency and happiness.

The mood scale × time interaction was found to be significant $F(2,32) = 21.66$, $p<.01$. This Anova also revealed a very large pre/post induction effect $F(1,16) = 83.05$, $p<.001$.

Figure 3 shows the same ratings for the 4 groups who underwent the sad induction.

In these groups, subjects' ratings of happiness decreased, those of anxiety remained about the same, and those for despondency increased.

FIGURE 2. MEAN MOOD SCALE SCORES FOR THE HAPPY GROUP

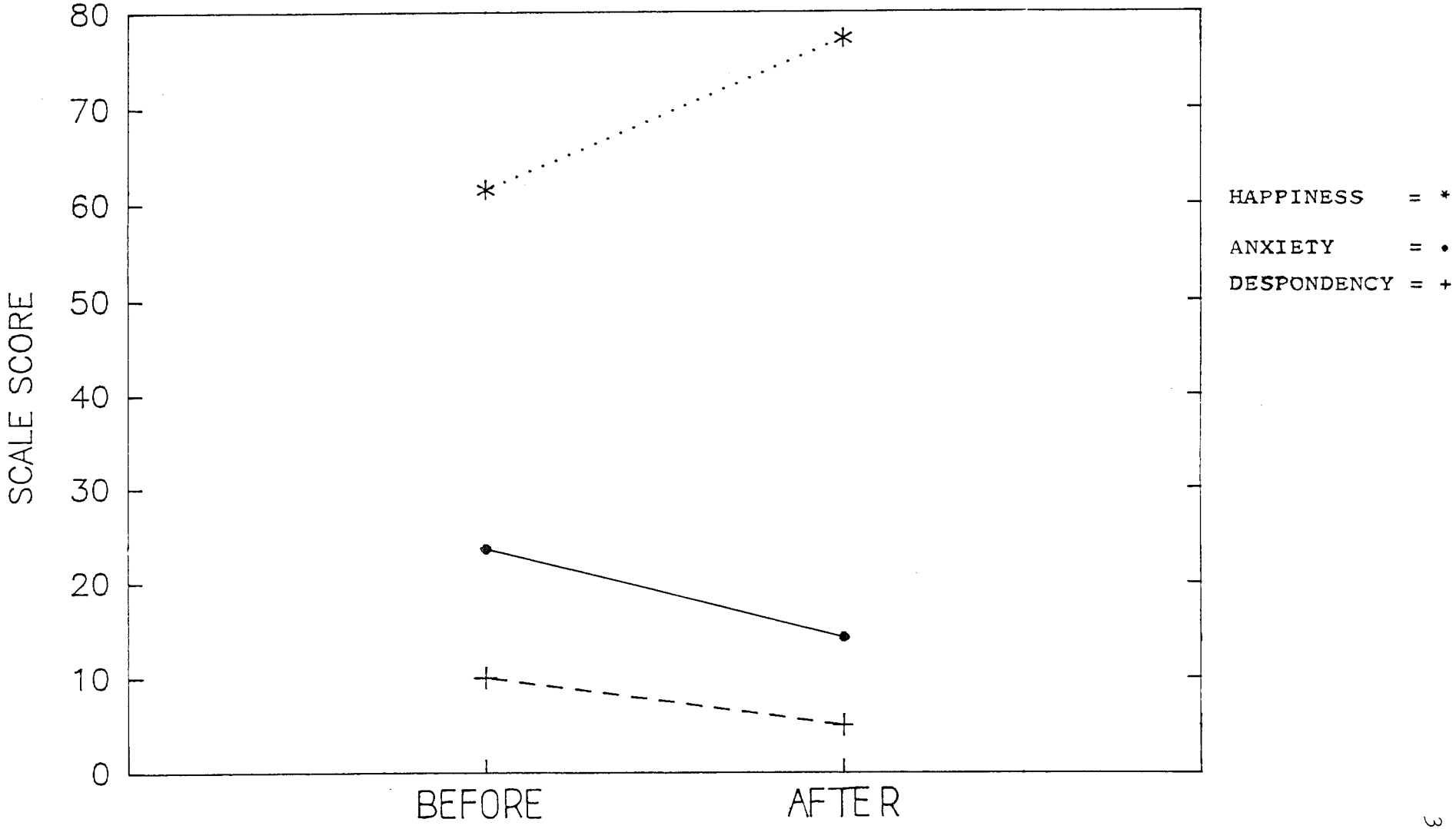
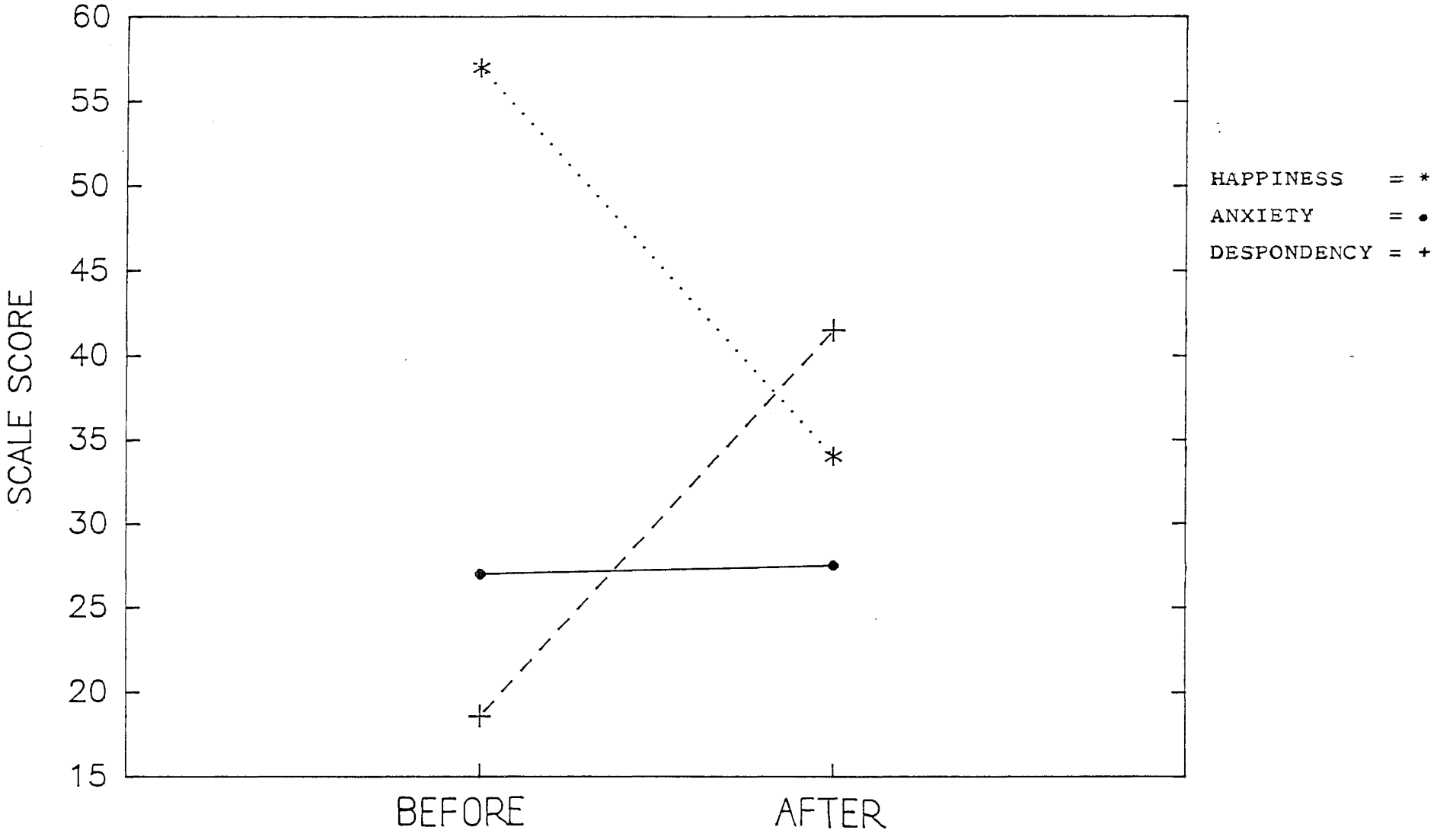


FIGURE 3. MEAN MOOD SCALE SCORES FOR THE SAD GROUP



3. For both inductions. Thus, according to subjects' ratings on the mood scale, the mood inductions were successful. Post-induction ratings for happiness increased significantly in the happy groups whereas the significant increases in the sad groups were for the ratings of despondency and anxiety.

Effects of Inductions on Writing Speed

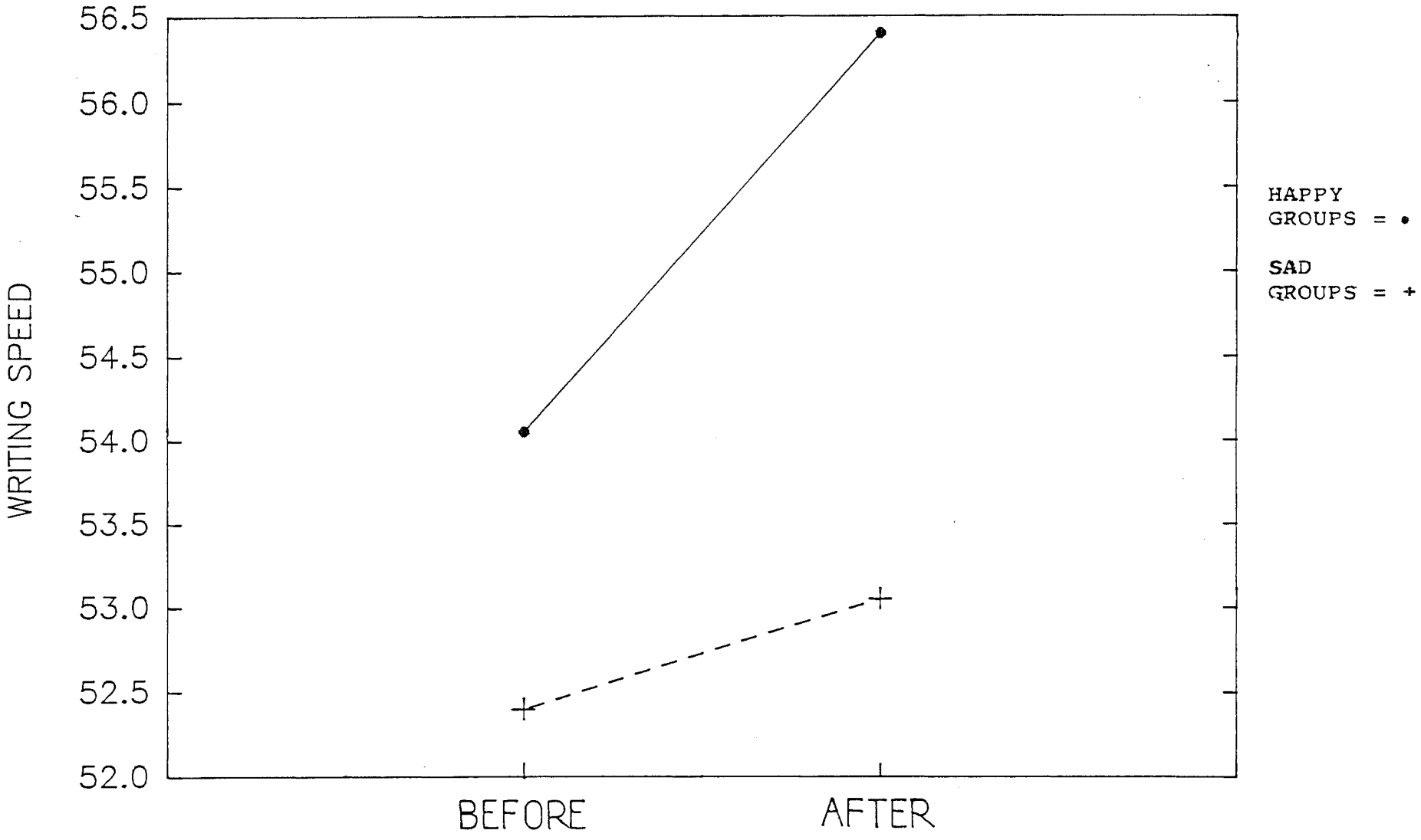
The pre and post induction writing speed scores for both happy and sad groups were analyzed together. Factors involved in the Anova were the type of mood induction and the pre and post induction writing speed scores.

The mood × time interaction was not found to be significant $F(1,38) = 1.85$, $p > .25$. A significant time effect was found $F(1,38) = 6.33$, $p < .05$. This was probably due to practice effects.

Figure 4 shows the mean writing speed before and after the mood inductions for both groups. As can be seen, the mean performance for the subjects after the happy induction increased to a greater extent than did that of subjects undergoing the sad induction.

Thus, according to subjects' performance on the writing speed task, the mood inductions were not successful.

FIGURE 4. MEAN WRITING SPEED FOR BOTH THE GROUPS



Effects of Inductions, List Length and Retention Interval On Word Recall

Anovas were performed for pairs of groups differing only in the type of mood induction undergone. For members of each pair analyzed, list length and retention interval were the same. Thus, the factors involved in each Anova were type of induction and the number of positive, neutral and negative abstract nouns recalled.

Table 2 shows the mean number of positive, neutral and negative words recalled in each of the eight groups.

I Groups who learnt the long (36 word) list.

1. Recall after the Short Retention Interval.

Figure 5 shows recall of the three types of words for groups who learnt the long list and had a retention interval of one hour.

In this pair of groups, both showed the same trend - better recall for negative words than for positive and neutral words. However, the sad group recalled a much greater number of negative words than did the happy group, and the happy group a slightly greater number of positive words than the sad group.

The greater recall of negative words was found to be significant $F(2,16) = 15.52$, $p<.01$, but there was no significant induction × kind of word effect - $F(2,16) = 2.54$, $p<.25$. Thus, there was no mood-congruent recall effect.

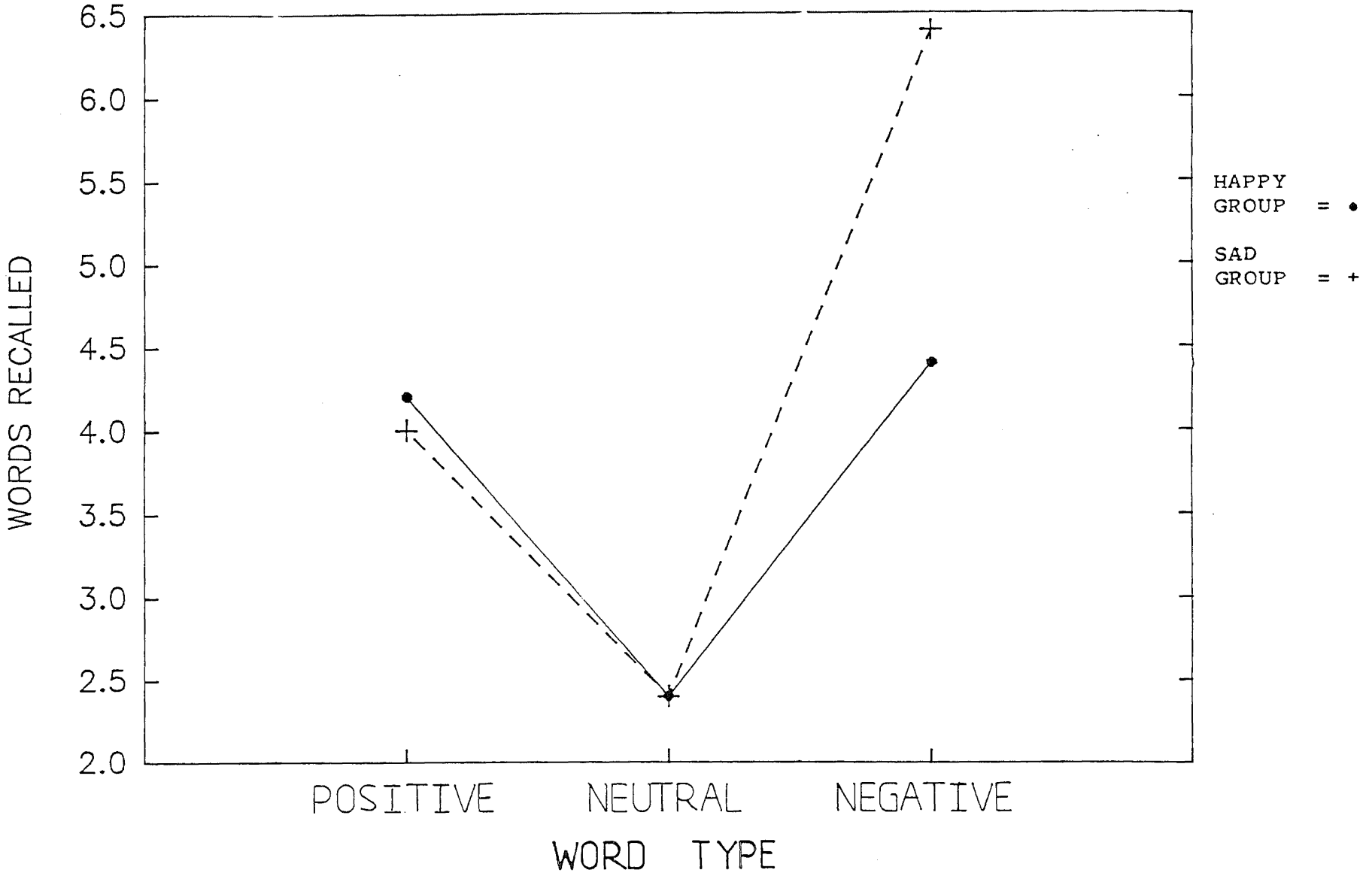
TABLE 2. Showing the Mean Number of Positive, Neutral and Negative Words Recalled in Each Group.

Word Type	Short List				Long List			
	One Hour		One Week		One Hour		One Week	
	Happy	Sad	Happy	Sad	Happy	Sad	Happy	Sad
Positive	5.2	3.4	2	2.6	4.2	4	4.1	3.2
Neutral	3.6	4.2	1.6	2	2.5	2.5	2.2	3
Negative	3.6	4	1.8	3.6	4.5	6.4	4.6	3.5

TABLE 3. Showing the Groups Presented with the Short Lists, A and B.

Retention Interval	Induction	
	Happy	Sad
Short (1 hour)	A	B
Long (1 week)	B	A

FIGURE 5. MEAN NUMBER OF WORDS RECALLED FOR LONG LIST AFTER 1 HOUR



2. Recall after the Long Retention Interval.

Figure 6 shows recall of the three types of words for groups who learnt the long list and had a retention interval of one week.

Both groups recalled a greater number of negative than positive words. Both groups also recalled a greater number of positive than neutral words. The happy group's recall was mainly for negative and positive words, whereas the sad group recalled almost equal numbers of all three word types.

Again the greater recall for negative words was found to be significant, $F(2,16) = 3.78$, $p<.05$, but there was no significant induction × kind of word effect $F(2,16) = 2.04, p<.5$. Therefore, no mood-congruent recall effect was found.

Thus for groups who learnt the long list and had either the short or long retention intervals, no mood-congruent effects occurred.

II Groups who learnt the short (18 word) list.

3. Recall after the Short Retention Interval.

Figure 7 shows the mean number of positive, neutral and negative words recalled for groups who learnt a short list and had a retention interval of one hour.

As can be seen, recall for the positive words in the happy group was much better than recall for neutral and negative words. Recall for positive words in the sad group though, was much worse than recall for neutral and negative words. This induction × kind of word effect was significant, $F(2,16) = 5.21$, $p<.05$. There seems to be a small mood-congruent effect.

FIGURE 6. MEAN NUMBER OF WORDS RECALLED FOR LONG LIST AFTER 1 WEEK

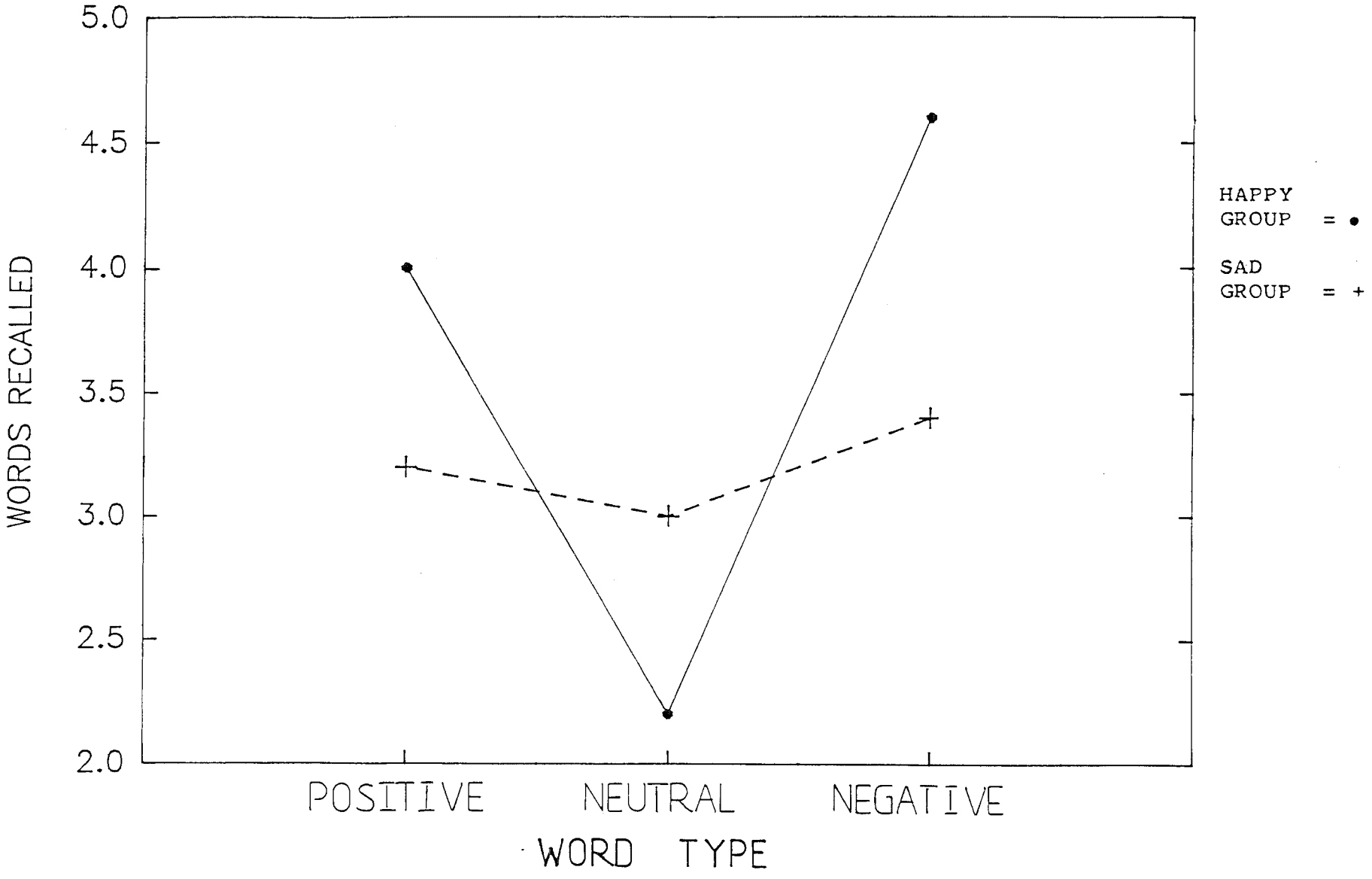
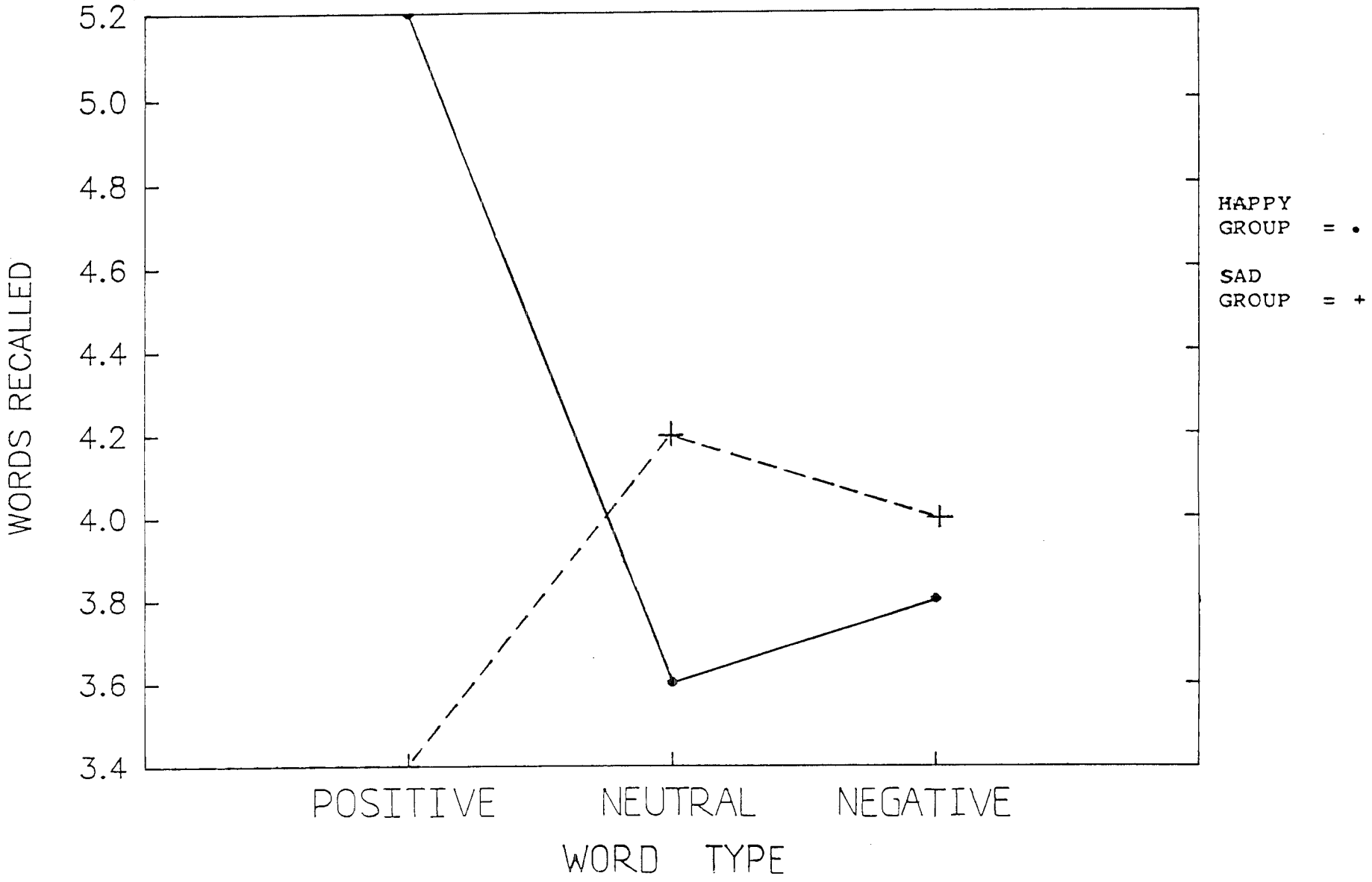


FIGURE 7. MEAN NUMBER OF WORDS RECALLED FOR SHORT LIST AFTER 1 HOUR



4. Recall after the Long Retention Interval.

Figure 8 shows recall of the three word types for the subjects who learnt the short list and had a retention interval of one week.

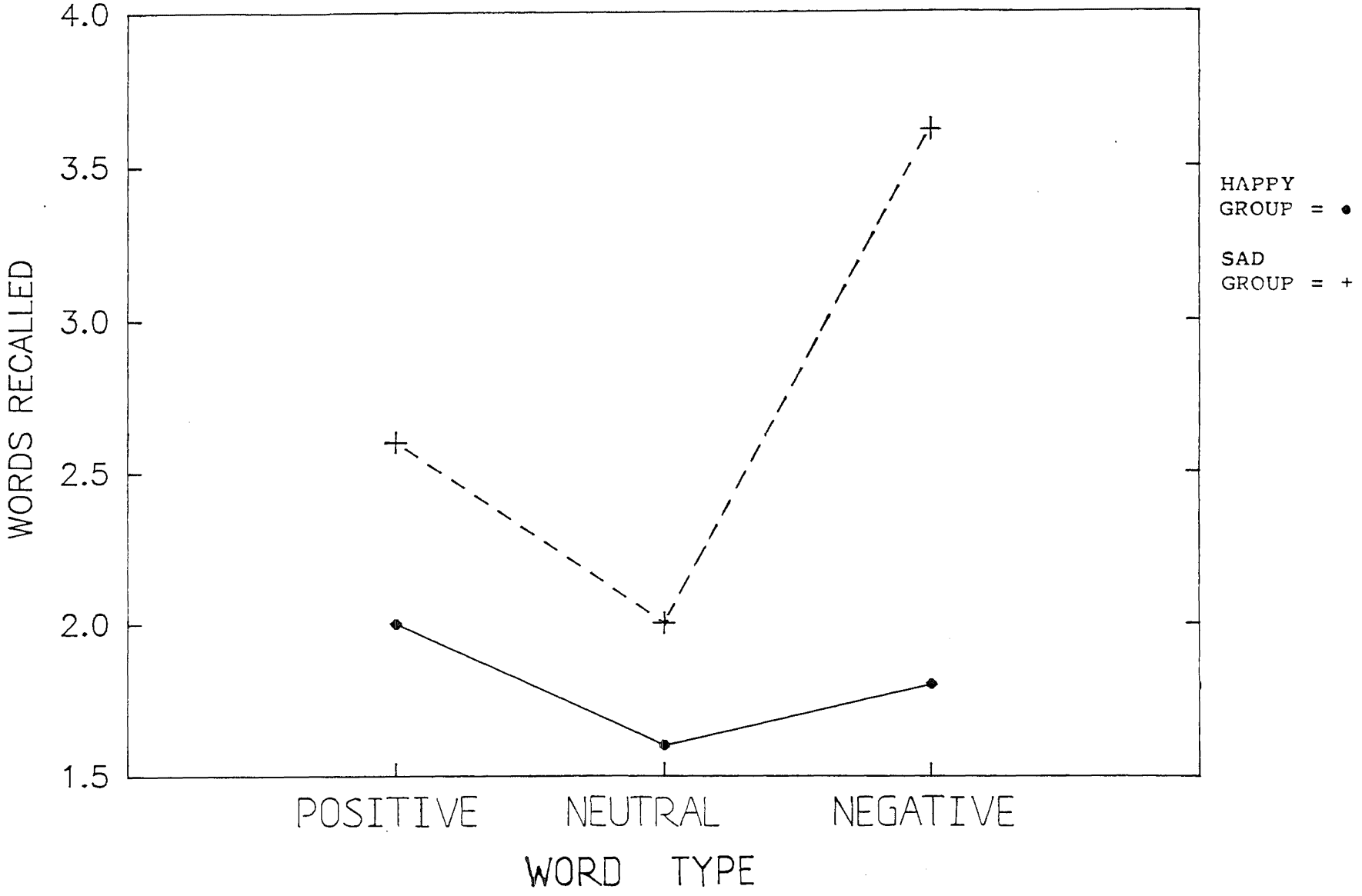
There was much better recall of all three types of words in the sad group, but there was greater recall of negative words than of positive and neutral words. In the happy group, recall of positive words was better than that of negative and neutral words. There seems to be a mood-congruent recall trend. However, the type of word × induction interaction was not at all significant $F(2,16) = .89$, $p<.25$.

Thus, for groups who learnt a short list and had a short retention interval, a small mood-congruent recall effect occurred. However, no mood-congruent recall effect occurred for the groups with the long retention interval.

Reanalysis of Word Recall Data

It is important to be aware of the fact that the same list was not presented to all the groups. The same 36 words (long list) were presented to all four of the long list groups. However, two different short lists were presented to the short list groups. One to both the happy induction, one hour retention interval group and to the said induction, one week retention interval group (list A) and the other to both the happy induction, one week retention interval group and the sad induction, one hour retention interval group (list B). See Table 3.

FIGURE 8. MEAN NUMBER OF WORDS RECALLED FOR SHORT LIST AFTER 1 WEEK



The type of analysis performed to determine the effects of induced mood on recall - i.e., the Anovas performed for the two pairs of groups in the preceding section, was made under the assumption that all factors, except for the type of mood induction, were equal for the pairs of groups. However, in the short list groups, group pairs analyzed together were not presented with the same list to learn.

None of the same words were found in lists A and B. All the words in the lists had concreteness ratings of between two and three on a seven point scale where 1 was highly abstract and 7 highly concrete, thus, their concreteness ratings were very similar. However, their ratings in terms of imagery, meaningfulness and frequency showed quite a range. (See Appendix 1).

Thus, if the fact that different lists were presented to the groups is taken into account, it is not possible to state conclusively that the mood-congruent effects obtained for the groups with the short retention interval were due entirely to the type of mood induced. It can be argued that the results obtained are a result of the different word lists presented to the two groups.

If the short and long retention interval groups who learnt the short lists are analyzed together however, the same pool of words (lists A and B) would be common for all four groups. This analysis is made with the assumption that the relative memorability of all the words in the lists does not alter with the different retention intervals.

All four short list groups were thus analyzed together, in order to determine that the results previously obtained were not due to the particular words used. Factors included in this Anova were type of induction, retention interval and word type. The looked for interaction, that of induction type × word type was not significant $F(2,32) = 2.79$, $p<.10$. In terms of this more rigorous analysis, therefore, there is no mood-congruent recall effect.

The results may be summarized as follows:

The mood inductions were successful in terms of ratings on the mood scales - there was a significant increase for happiness in the happy groups and a significant increase for despondency and anxiety in the sad groups.

In terms of the more objective measure of writing speed, however, no significant effects were found. Thus, no mood-congruent writing speed effects were produced.

Results for word recall differed with the type of analysis performed on the data. When pairs of groups were analyzed together, with the assumption that lists A and B are equivalent, the groups who learnt the short list and had the one hour retention interval showed a significant mood-congruent recall effect. However, when all four short list groups were analyzed together so as to allow for the fact that lists A and B are not the same, no mood-congruent recall effects are seen.

CHAPTER IV

Discussion

The experiment described in this thesis was part of an attempt to clarify the efficacy of Bower's associative network theory in predicting mood-memory interactions for verbal labels. The confines of this effect were investigated with the use of positive, negative and neutral abstract nouns, which are not very emotionally salient words. The factors of list length and retention interval were varied differentially with the hypothesis that longer lists and longer retention intervals would place a greater strain on memory and thus increase the effectiveness of mood as a recall cue for the nouns.

Unfortunately, the results obtained from the experiment are anything but clear. It is not possible to draw any definite conclusion regarding the confines of the recall-mood-memory effect from them. Nor is it possible to say whether or not longer lists and retention intervals had a facilitating effect on the effectiveness of mood as a recall cue.

The results can be summarized as follows:

1. There is doubt as to whether or not mood was induced in the subjects by the induction procedures. Although post-induction ratings on the mood-scales were significant, suggesting that the inductions had been successful, results for the more objective behavioural mood measure, the writing speed task, were not significant.

2. Two separate analyses of the word recall data produced different results:

(a) One analysis found significant mood-congruent recall effects for the groups who learnt the short lists and had the short retention interval. This result was contradictory to what was originally hypothesized - that it would be the long list and the long retention interval which would increase the effectiveness of mood as a recall cue.

(b) The other analysis showed no mood congruent effects at all. These results suggest that mood does not act as a recall cue for mood-congruent abstract nouns learnt in a neutral mood.

The results can be interpreted in a number of ways:

1. a) That mood changes were induced, (see the highly significant ratings on the mood scale scores), but that these changes were not strong enough to affect performance on the writing speed task or on word recall.

b) That mood changes were induced, but that these mood changes were very weak and thus mood-congruent effects were seen where the least strain on memory was involved - in the recall of short lists after the short retention interval.

c) That mood changes were induced, but weakly, and that the significant result obtained for the short list-retention groups was merely a confounding effect of the different lists presented to the subjects (as shown in the reanalysis of the data).

2. That there was no induction of mood. The significant ratings on the mood scale scores were just a result of the suggestive statements on the induction cards. Subjects only thought they were experiencing a particular mood, but

in fact were not. Moods were not induced as no mood effects were seen on the writing speed task - a measure that has been shown to be sensitive to mood changes in other studies (Velten 1968; Natale and Hantas 1982; Natale 1977). Thus any other effects obtained could not be said to be mood-related.

The present ambiguous results could be clarified if a further and more sophisticated experiment were to be conducted. This would involve at least these improvements:

1. Greater certainty is needed regarding whether or not a mood has been induced. Thus, a more sensitive mood measure than writing speed is needed (e.g., the Grass 7D polygraph used by Teasdale and Russell 1983), and/or some 'mood criterion' should be decided on to serve as a cut-off point on which subjects' results are accepted. For example, only subjects whose post-induction ratings for their induction moods is 30 points higher than their pre-induction ratings would be accepted.
2. The list presented to subjects within the same list group should be constant.
3. Control groups may be used. These groups would perform all the tasks the mood-induction groups perform, but at induction, would be asked to read neutral statements. Comparisions between the control groups and the induction groups would also serve as a mood change measure.

The experiment just described would produce mood-congruent results only if the mood-as-recall-cue effect is reasonably robust. This is because subjects are asked to recall the words learnt after a certain interval has passed. Within this time interval, interference from other

variables would occur, so that mood would have to be a strong cue to selectively retrieve mood congruent material.

However, if the effect of mood as a recall cue is not robust, then the less strain on memory, the better. If the assumption is made that the mood-recall effect is weak, a replication of the Teasdale and Russell study (1983), using abstract nouns as stimuli, would be a better test for it than the experiment just discussed.

In Teasdale and Russell's study, where personality trait words were used as stimuli, significant mood-congruent recall effects were obtained. In this experiment, subjects were first presented with a 36 word list in 56 seconds, then asked to count from one to ten (for the polygraph test) and then to rate their moods. After this they received the induction, which was immediately followed by the counting and the rating on the mood scale. Subjects were then asked to recall all the words they could remember from the list they had previously been presented with. About 15 minutes would have elapsed from the presentation of the list to its recall.

An explanation for the effect that could lead to the recall of mood-congruent abstract nouns can be given in terms of the associative network theory of memory and emotion. Presentation of the list will activate those particular words in memory. The induction procedure follows the presentation of the list almost immediately. If it is assumed that activation decays at a slow rate (something we do not yet know), it can be hypothesized that the list words will still be slightly activated when the mood is

induced. Induction of a mood will cause activation of that particular emotion node and its associated pathways and thus mood congruent words from the list will be more likely to come to mind as they receive activation from both the mood induction and the list presentation.

Although no firm conclusions can be drawn from the experiment conducted for this thesis, it is hoped that the two further experiments suggested would help to clarify the effects of mood as a recall cue for abstract nouns.

Speculations

A number of speculations arose as a result of the study described in this thesis. They include possible reasons for why no mood-congruent effects were obtained in the experiment as well as short discussions on the utility of the associative network theory of memory and emotion and the necessity for further studies in the mood-induction field.

If it is assumed that the mood inductions worked and mood congruent effects were not obtained, a number of reasons can be postulated for this non-effect:

1. In the experimental situation, subjects were highly motivated to recall anything they could and thus no mood congruent effects were obtained. Mood might affect recall in conditions having lower motivation for performance.
2. Activation is seen to spread out along portions of the network associated with a particular node in a decreasing gradient, so that the farther removed and weaker the associative link, the less likely it is to be activated. It is quite possible that a hierarchy of emotional terms

exists for each emotional node - the more frequently used emotional terms (those used to describe emotional experiences, feelings, etc.) at the top of the hierarchy and the less frequently used terms (such as abstract nouns), at the bottom. In order for the verbal labels at the bottom of the hierarchy to be activated, the mood induced would need to be either very strong, or fairly long-lived. The moods induced in this experiment were neither and thus no mood-congruent effects occurred.

3. It is possible that abstract nouns are not coded in terms of their hedonic tone at all. Perhaps only verbal labels and descriptions used to describe emotional experiences are associated with a particular emotion node. To test whether positive and negative abstract nouns are perceived as emotional - and encoded as such, they should be studied in a mood-at-learning situation. That is, first induce a mood, present the abstract nouns and then ask the subjects to recall the nouns in a neutral mood. If there is greater recall for mood-congruent abstract nouns, then it could be concluded that abstract nouns are affected by the mood at learning and are thus selectively encoded in terms of their hedonic tone. From this can be assumed that abstract nouns are also associated to emotion nodes.

The Associative Network Theory of Memory and Emotion

Bower's associative network theory has served as an important part of the endeavour to understand emotion-cognition relationships. It has been able to deal competently with mood-memory interactions and has permitted predictions to be made regarding these interactions. Its main value has been in enabling researchers to deal

practically with emotion and its memory aspects.

However, the question remains as to whether it is reasonable to view emotion wholly in cognitive terms, for in the associative network theory, emotion nodes are no different from other concept nodes in the way they act and are acted upon (Ritchie 1984).

Bower and Cohen (1983) recognized this shortcoming and their new theory postulates how emotions are aroused in the first place. Nevertheless, little attempt has been made to view cognition in emotion terms. To quote Ritchie, "present studies emphasize the cognitive basis of emotion and emotion related memory phenomena, at the expense of emotional processes that regulate cognitive operations". (Ritchie 1984, p.44).

More questions such as, e.g., whether the strategies people use to recall previously learnt material differs with the kind of mood experienced (see Leight and Ellis 1981; Ellis, Thomas and Rodriguez 1984), need to be looked at. The concept of two separate systems for semantic and emotional qualities (Posner and Snyder 1978; Strongman and Russell 1982) and the fact that they may behave differently is related to this area of study.

Also concerned with the concept of cognitive and emotional systems is a question brought about by the study described in this thesis. From Tulving and Thomson's encoding specificity hypothesis (1973), whereby "the effectiveness of a retrieval cue may depend on the way in which the material was originally encoded", the following

is possible.

All the mood-congruent recall effects so far revealed can be explained in terms of the state-dependent effect: it can be argued that mood at recall is acting as a context retrieval cue for the material; that the mood-congruent material recalled was originally encoded while the subject was experiencing the congruent mood state.

However, abstract nouns would be less likely to have been present while an individual was experiencing a particular mood (Teasdale and Russell 1983). Therefore, if mood-congruent recall effects are produced with them as stimulus material, it would suggest either that 1) abstract nouns do constitute a part of emotional experience, or 2) that abstract nouns, whether encountered in a congruent mood or not, are encoded in terms of their hedonic tone (as Teasdale and Russell 1983 imply). This effect would include other verbal labels since abstract nouns are some of the least emotional verbal labels.

The fact that emotional material is recognized as such and encoded as such in a neutral mood would imply that there is some sort of 'emotional perceptor', coding semantic material, thus perhaps pointing to the existence of emotion codes as opposed to cognitive codes.

This is mere speculation. Nevertheless, it should be emphasized that the emotion-cognition area is a complex one - so many different factors are at work - the emotionality of the material, the type of mood induced, as well as the possibility that there may be separate emotion and cognition

systems and if so, that they may behave differently.

Mood Inductions

Studies on mood-inductions, looking at how they work as well as how induced mood may be measured, are a good means of investigating mood-memory interactions. Mood has been induced in a number of ways: hypnosis, self-referent statements, films, story telling, game situations and electric shock are some of the means that have been used. Further work on induced moods is necessary as the type, intensity and saliency of the moods each method induces will be different because the means of induction are so varied. Besides this fact, very few behavioural measures exist for gauging the robustness of the individuals' moods, once induced.

Although films have been used to induce moods (Lazarus, Speisman, Mordkoff and Davison 1962; McHugo, Smith and Lanzetta 1982), little effort has gone into working out how to employ them successfully as a means of inducing mood.

Music therapy is said to encourage the acting out of the emotions (Priestly 1975). Music may help to serve as a nonverbal means of inducing a mood in an individual, and it may be used with films instead of the verbalizations. A large amount of work is required in this area, as reactions to music tend to be very personalized. However, it is felt that this area would be a profitable one to look at.

Work in the area of mood-induction would provide useful information on mood-behaviour and mood-cognition effects. Researchers would gain knowledge of how to change mood, how to influence mood intensity and even how moods may come about.

Not only would studies on perfecting and understanding means of mood induction help with induction of mood in mood-cognition studies, they could perhaps be used even for therapeutic purposes. It may be possible to use the perfected mood-induction methods on patients suffering emotional disorders as a means of helping alleviate negative emotion states.

In conclusion, it remains only to emphasize the need for more studies in the mood-memory area. It is important that all three main interactions - mood at learning, mood at recall, and mood at both learning and recall, be attended to. Because mood provides a "context for ongoing thought processes without noticeably interrupting them" (Simon 1982 p.336), its effects on our behaviour are many and varied. Studies such as the one discussed in this thesis help add to our understanding of the scope and nature of mood-memory interactions. They provide us with valuable insights into areas as diverse as social interactions and emotional disorders and thus are of great importance.

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APPENDIX 1

The Word List, With Means and Standard Deviations On Ratings of Imagery, Concreteness, Meaningfulness and Frequency

POSITIVE ABSTRACT NOUNS							
	I		C		M		F
	M	SD	M	SD	M	SD	
GAIETY	5.63	1.31	2.15	1.44	6.72	2.35	5
MIRACLE	3.33	1.80	2.25	1.79	5.60	2.38	24
AFFECTION	4.87	1.84	2.18	1.68	6.36	2.14	37
PLEASURE	4.80	1.55	2.10	1.52	5.54	1.89	AA
HEROISM	4.17	1.78	2.26	1.40	5.84	2.15	5
FUN	5.23	1.68	2.45	1.34	5.50	2.17	A
VICTORY	4.93	1.27	2.95	1.32	6.12	2.33	A
VIGOUR	4.43	1.83	2.60	1.33	5.72	2.54	19
PEP	4.60	1.75	2.73	1.48	6.04	2.30	3
JOVIALITY	5.20	1.53	2.14	1.15	5.20	1.32	0
HUMOUR	4.57	1.81	2.31	1.38	5.72	1.77	41
STRENGTH	4.63	1.80	2.90	0.57	5.12	1.59	AA

I = Imagery - a word's capacity to arouse nonverbal images

C = Concreteness - directness of reference to sense experience

M = Meaningfulness - the mean number of written associations in 30 seconds

F = Frequency - according to the Thorndike-Lorge norms where

0 - 9 = Low Frequency

10 - 49 = Medium Frequency

A - AA = High Frequency

NEUTRAL ABSTRACT NOUNS							
	I		C		M		F
	M	SD	M	SD	M	SD	
TIME	4.13	2.28	2.47	1.68	7.00	2.80	AA
OPINION	3.23	1.84	2.29	1.54	4.96	2.14	AA
SITUATION	2.53	1.52	2.76	1.41	4.84	2.03	A
ECONOMY	3.20	1.82	2.28	1.18	5.88	2.86	21
AGILITY	4.57	1.91	2.93	1.55	5.75	1.24	2
METHOD	2.63	1.64	2.20	1.24	5.20	1.66	AA
QUALITY	3.10	1.92	2.13	1.26	5.52	2.42	A
MOMENT	2.50	1.62	2.52	1.53	4.38	1.56	AA
CUSTOM	3.43	1.77	2.99	1.64	5.33	1.74	A
OUTCOME	2.40	1.49	2.80	1.54	4.24	1.74	8
INCIDENT	2.90	1.67	3.00	1.56	4.16	1.46	29
COMPARISON	2.93	1.76	2.69	1.56	4.56	2.22	25

NEGATIVE ABSTRACT NOUNS							
	I		C		M		F
	M	SD	M	SD	M	SD	
PANIC	5.33	1.71	2.18	1.16	6.72	2.01	19
IRONY	2.83	1.74	2.10	1.39	5.24	1.67	4
VIOLATION	3.57	1.91	2.92	1.50	5.92	1.75	8
HOSTILITY	4.23	1.62	2.18	1.24	5.64	2.14	12
CHAOS	4.57	1.91	2.50	1.74	5.88	1.88	9
CRISIS	3.43	1.72	2.81	1.47	5.44	2.12	19
TROUBLE	3.53	1.86	2.25	1.54	5.08	2.10	AA
BEREAVEMENT	3.87	1.64	2.49	1.41	5.75	2.18	1
TRAGEDY	4.70	1.69	2.59	1.52	5.84	1.65	27
ATROCITY	3.67	1.92	2.38	1.35	4.17	2.04	2
DEATH	5.00	1.93	2.97	1.93	7.12	2.60	AA
IMPOTENCY	3.40	2.06	2.62	1.92	3.16	1.80	0

- Taken from Paivio, Yuille and Madigan, 1968.

APPENDIX 2

Instructions on Cassette

"This is a study involving mood induction. Essentially, I am trying to determine if people can talk themselves into a specific mood or feeling. Your success in talking yourself into the mood will depend to a great extent on your cooperation and willingness to participate in the experiment. This is not intended to be harmful or frightening but is only an effort to find out if people can induce moods in themselves.

The materials for the study are arranged on the table in front of you. To your left you will see a small pile of paper. Please take the top 2 slips of paper.

The smaller slip is a mood scale to show how you feel now, at this moment. Rate each of the three moods shown on a scale of 0 to 100 where 0 is not at all anxious, despondent or happy, and 100 is extremely anxious, depondent or happy. Please fill in the mood scale now, rating how you feel now, at this moment.

The other sheet of paper is for you to do your writing speed task on. When I say 'GO' I want you to write as fast as you can, in numbers, the numbers descending from 100. I will give you 1 minute to do this. At the end of 1 minute, I will say 'STOP'. Please stop writing then. Get ready - GO ... STOP.

Please move the stack of cards on your right directly in front of you. Do not look at the cards until I tell you to do so. There are 15 cards in the pile, the first 3 containing instructions. The remaining 12 cards contain mood statements which, when read, will suggest a specific feeling and help you to induce that feeling in yourself.

Please read the statements first to yourself and then aloud. Wait till you hear a tone (beep) - so. This tone will be your signal to pick up and read the first mood statement card. After reading this card to yourself and then aloud, continue to look at and concentrate on the statement until you again hear the tone, which will be your signal to pick up and read the next mood statement card. Continue in this manner until you have viewed and read each mood statement card. Remember - do not go on to the next card until you hear the tone. Look at the first card now. (12 tones every 20 seconds).

Take the last 2 slips of paper on your left. One is the mood scale, the other is for the writing speed task. Along the mood scale, rate each mood on a scale of 0 to 100. Rate how you feel at this moment. Please fill in the mood scale now.

Take the piece of paper for the writing speed task. Once again, write, as fast as you can, the numbers descending from 100. I will give you 1 minute. Get ready - GO ... STOP.

Now, take the last slip of paper on your left. I would like you to write down all the words that you can remember from the list you learnt in part one of the experiment. I will give you 2 minutes to do this. Please start writing now. Please stop writing."